**Lesson 3 –** *Content Notes*

**Decimals**

**C:\Users\Kiera Jay\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\CGM49ZRG\MC900055589[1].wmf**

A decimal is a way of writing a number that is not whole. Decimal numbers are 'in-between' numbers.

**For example**: 5.25 is **in between** the numbers 5 and 6. It is **more** than 5, but **less** than 6.

**Note**: Decimals can be converted to and from percentages and to and from fractions ☺

**For example**: ¼ (a quarter) of a dollar is the same as 0.25 cents

**Place Value and Decimals**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Hundred Billions | Ten Billions | Billions |  | Hundred Millions | Ten Millions |  |  | Hundred Thousands | Ten Thousands | Thousands |  | Hundreds | Tens | Ones/Units |  | Tenths | Hundredths | Thousandths | Ten Thousandths | Hundred Thousands |
| **2** | **1** | **0** | **,** | **9** | **8** | **7** | **,** | **6** | **5** | **4** | **,** | **3** | **2** | **1** | **.** | **2** | **3** | **4** | **5** | **6** |

This chart shows the place value of the number 210,987,654,321.23456.



This is how you say it :

“Two hundred ten billion, nine hundred eighty seven million, six hundred fifty four thousand, three hundred twenty one, and twenty three thousand four hundred fifty six hundred thousandths”

**Powers of 10**

A **power of 10** is any of the integer powers of the number ten; in other words, ten multiplied by itself a certain number of times

**Powers of 10 Chart**

|  |  |
| --- | --- |
| Billions 109 = 1,000,000,000 10 x 10 x 10 x 10 x 10 x 10 x 10 x 10 x 10 = 1,000,000,000  Millions 106= 1,000,000 10 x 10 x 10 x 10 x 10 x 10 = 1,000,000  Hundred Thousands 105 = 100,000 10 x 10 x 10 x 10 x 10 = 100,000  Ten Thousands 104 = 10,000 10 x 10 x 10 x 10 = 10,000  Thousands 103 = 1,000 10 x 10 x 10 = 1,000  Hundreds 102 = 100 10 x 10 = 100  Tens 101 = 10 ones 100 = 1 | Tenths 10-1 = 1/10 1/10 = 0.1  Hundredths 10-2 = 1/102 1/102 = 0.01  Thousandths 10-3 = 1/103 1/103 = 0.001  Ten Thousandths 10-4 = 1/104 1/104 = 0.0001  Hundred Thousandths 10-5 = 1/105 1/105 = 0.00001  Millionths 10-6 = 1/106 1/106 = 0.000001  Billionths 10-9 = 1/109 1/109 = 0.000000001 |

**Scientific Notation**

C:\Users\Kiera Jay\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\Z3ZMMUNZ\MC900384174[1].wmf

* Do you know this number, 300,000,000 m/sec.?

It's the Speed of light !

* Do you recognize this number, 0.000 000 000 753 kg. ?

This is the mass of a dust particle!

Scientists have developed a shorter method to express very large numbers. This method is called**scientific notation**. Scientific Notation is based on powers of the base number 10.

The number 127,000,000,000 in scientific notation is written as:

*The first number 1.27 is called the coefficient*. It must be greater than or equal to 1 and less than 10.

*The second number is called the base* . It must always be 10 in scientific notation. The base number 10 is always written in exponent form. In the number 1.27 x 1011 the number 11 is referred to as the exponent or power of ten.

So the number is written in **two parts**:

* Just the **digits** (with the decimal point placed after the first digit), followed by
* **× 10 to a power** that puts the decimal point where it should be (i.e. it shows how many places to move the decimal point).

**For example**:

Write 5326.6 in scientific notation

5326.6 is written as **5.3266 × 103**,

…because…

5326.6 = 5.3266 × 1000 = 5.3266 × 103

*Check Point*

After putting the number in Scientific Notation, make sure that:

* The "digits" part is between 1 and 10 (it can be 1, but never 10)
* The "power" part shows exactly how many places to move the decimal point

For more examples go to: <https://www.purplemath.com/modules/exponent3.htm>